

## **Mitigation and Remedial Actions**

### **A. Types of Actions.**

***Temporary measures*** to mitigate against physical safety hazards include posting warning signs and fencing.

***Remedial measures*** to prevent/address physical safety hazards include closures of adits and shafts, backfilling of highwalls, drainage of impoundments, removal of leftover equipment and debris, and revegetation to help offset erosion and improve land stability.

In determining appropriate mitigation or remedial measures the Field Office may consider the State or Tribal AML agency standards for the vicinity where the AML hazard is located as guidance, (i.e., Colorado BLM offices would look to Colorado State standards). If the State or Tribe has not issued such standards, then the Field Office should contact the Washington Office for further guidance. State Office AML Coordinators, and State and Tribal government AML agencies can provide guidance to Field Offices on constructing and maintaining temporary and remedial measures. The particular measures selected will depend on the Field Office's judgment as to which measures best effectuate AML safety objectives as balanced against other BLM and Field Office program objectives, priorities and resource allocation decisions. Additional criteria that need to be analyzed and considered are those identified by undertaking reviews in accordance with the National Environmental Policy Act. In locations where significant visitors are unlikely to be able to interpret warning signs posted in the English language, supplemental signs in additional languages and/or pictorial images should be considered for use in the event it is determined that the posting of signs is appropriate.

### **B. Examples of Factors to Consider in Decisions.**

Actions to reduce or eliminate potential injury or death from physical hazards at AML sites incur both initial action and long-term maintenance costs. Moreover, alternatives available may depend largely on local conditions, such as the availability of suitable material for backfilling. Generally, the most common means of mitigating hazardous land conditions are: (a) guarding against the hazard; and/or, (b) warning against the hazard. Thus, as part of deciding what appropriate mitigation or remedial actions to take, Field Offices should usually consider guarding and/or warning methods for mitigation of hazards.

**Guarding Against the Hazard.** In general, Field Offices should consider as many options as possible and take the course of action that a reasonably prudent person would take in a similar circumstance to the extent practicable in terms of cost, available technology and However, the actual measures selected may also depend on competing BLM priorities, objectives, responsibilities and resource allocation decisions. Field Offices should weigh and balance these factors in determining the most appropriate course of action.

For example, BLM could consider posting a guard outside of each mine entrance to ensure that no members of the public enter the site. This option, however, would require an extraordinary commitment of staff and funds that go beyond available human and budgetary resources. As such, this option would not be considered economically feasible under the circumstances. Sealing the mine entrances would be another option. Some of these mines, however, are used by bats and other wildlife as habitat. Therefore, while this option may be economically feasible, it might not be consistent with the BLM's obligations to protect the environment, including wildlife resources. Thus, this action would not be appropriate. Under the preceding example, BLM could give consideration to a mechanism to block an entrance to a mine by humans but still allow necessary access to wildlife (i.e., a bat gate). Assuming that this is available technology and that it is economically feasible and effective in restricting access to humans, then this is the type of option that might be appropriate.

**Warning of the Danger.** In instances where the Field Office determines it is not feasible to physically guard against dangers, it should consider posting warning signs. If signs are posted, Field Offices should take periodic measures to maintain signs and keep records of maintenance activities. Consideration should also be given to whether posting signs might increase the hazard by attracting people to the AML site. Other methods of issuing warnings such as instructional videos, talks, pamphlets, and other material may also be considered.

Additional economic factors to consider are the costs of taking and maintaining temporary measures, i.e., signs and markers, or fences, versus costs of permanent closures of adits and shafts and other warnings for hazards such as highwalls, impoundments, and leftover debris and equipment. For example, where transportation costs are high, it may make more economic sense to take on-the-ground actions or post warning signs during the initial site visit rather than incur the additional transportation costs of frequent return visits to check on signs and markers. Similarly, in areas where keeping signs and fences maintained has proven difficult in the past, incurring the added up-front costs of permanent closures may be the more sensible alternative to continual sign or fence replacements.